Jan 2009

4WD-RPB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Don Williams, Plant Environmental Coordinator
Grenada Manufacturing, LLC
635 Highway 332
Grenada, Mississippi 38901

SUB: Groundwater Monitoring Program Optimization Plan
Sludge Lagoon Closure and Post Closure Monitoring Plan
Grenada Manufacturing, LLC / EPA ID No. MSD007037278

Dear Mr. Williams:

Pursuant to Grenada Manufacturing, LLC's Hazardous and Solid Waste Amendments Permit dated December 23, 2005, the Environmental Protection Agency (EPA) is hereby approving the facility's Groundwater Monitoring Program Optimization Plan dated April 9, 2008, and the facility's revised Sludge Lagoon Closure and Post Closure Monitoring Plan dated December 23, 2008. The Mississippi Department of Environmental Quality (MDEQ) has also communicated its approval of both plans to EPA.

If you have any questions or concerns regarding this letter, please contact Mr. Don Webster, your EPA Project Manager, at (404) 563-8469.

Sincerely,

D. Karen Knight
Chief, Corrective Action Section
RUST Branch
Waste Management Division

cc: Toby Cook, MDEQ
Linda S. Furlough, ArvinMeritor
Ihsan AlFayyomi, Brown and Caldwell
David O'Connor, Textron Automotive

May 2008
Sent by email

Ihsan;

Here are the combined comments of Sharon Matthews and myself. I don't think there are any show stoppers here. If you can address these by email it would be optimal. Lets have a conference call with Arvin Meritor, Don Williams, Sharon Matthews and your people once you have had time to look over these comments.

My intent is to issue letter of approval with Jeff's signature for your CMS work. That may take a month to get after we agree on the CMS Workplan. I want you to proceed with the field work this summer, so if a verbal from Jeff is what you need to get it started, I will ask Jeff for that.

Thank you for your timely efforts to date.

Sincerely, Don

Don Webster Comments:

1. The purpose of the Corrective Measures Pre-design Investigation Results was consistent with the Corrective Measures Pre-design Workplan. EPA considers that the former report satisfies the requirements for a Corrective Measures Study Report, while the latter report satisfies the requirements for a Corrective Measures Study Workplan. With the approval or conditional approval of the Corrective Measures Study Report, Grenada Manufacturing will be able to move forward with construction of the selected and approved remedy.

2. Section 1.4 of the CMS report correctly identifies the remaining remedial situations at the facility.

3. EPA agrees with the facility's assessment that the Lagoon Temporary Wells and the Plant Temporary Wells may now be abandoned according to Mississippi State requirements.

4. EPA agrees with the facility's decision to close the Sludge Lagoon Area with in-place stabalization of the sludge based on the data and recommendations made in Section 4.0 of the CMS Report and to construct a cap system based on the vadose zone delineation results described in section 3.0 of the Report. If this is not a clean closure, i.e., the lagoon is being closed with waste in place, then the facility must add the Sludge Lagoon, SWMU 4 to the Financial Assurance Plan for the facility in accordance with the permit.

Sharon, I talked to Brown & Caldwell about why they did not analyze for VOCs and semi-volatiles in groundwater. They said that was not the objective of this study. We know that there is still TCE and some toluene in the groundwater. They were looking for recoverable pockets of LNAPL and DNAPL. Do you agree with that? BTW, the size of the Sludge Lagoon is about 250' by 150'. I forgot to ask how deep the sludge was. If it is 3' deep, this is 56,250 cubic yards of contaminated sludge. I think that is about 5,000 dump truck loads. What do we need to know about the waste left in place? I know the sediment has been characterized, I don't have that report in front of me. I assume you will need to know that to make a determination if it is appropriate to cap this SWMU? Please tell me what you need and I will either find it or ask the facility to find it.

5. AOCs A and B, are the main sources of TCE and toluene contamination whereas the location of the former Chrome Plating Lines downgradient of AOCs A and B is one of the main sources of Hexavalent Chromium contamination at the plant. Flux of LNAPL and DNAPL contaminants toward the already installed Permeable Reactive Barrier may be desireable. At the same time EPA wishes to confine the Hexavalent Chromium Plume under the Main Plant Building where it has an Institutional Control until plant closure. However, the most important factor here is the potential for indoor air contamination of the Main Plant Building from the toluene and TCE contamination. Therefore, anything which retards the flushing or breakdown of TCE and toluene contamination is less desireable. The EPA accepts the facility's recommendations in Section 6.4 of the CMS Report, including the committment to conduct an additional indoor air monitoring event. The last indoor air monitoring events were conducted in February and August of 2004. EPA is of the opinion that both 'heating' and 'cooling' temporal events are necessary for a complete evaluation. Therefore, EPA would like the paired event repeated in 2009 using the same monitoring locations as before. If the results of the 2009 monitoring confirm that TCE and Toluene are flushing from under the Main Plant Building, and there is no buildup of Indoor Air contaminants, then future Indoor Air Monitoring can be suspended and the Sheet Pile Barrier need not be built.

6. The High-Vacume Multi-Phase Pilot Test appears to have been unsuccessful. The facility may return to manual bailing during monitoring events for removal of LNAPL as long as the results of the 2009 Indoor Air sampling support this decision.

Sharon, is there any other technology the facility should have considered, or is this LNAPL and DNAPL just simply diluted out from the source area?

7. Regarding the Institutional Controls that the facility lists in Section 7.3 Items 1., 2., and 3: where are the stated institutional controls recorded in a signed, written document? This must be specified in the permit.

8. EPA agrees with the additional controls proposed by the faciltiy in Section 7.4 Recommendations.

9. EPA will require deed restrictions similar to those in use for the Chrome Plating Line at the Sludge Lagoon if the unit is closed with waste left in place. This will be specified in the permit.

Sharon Matthews and SESD Comments:

Section 1: Section 1 was a good summary of past investigations at the site and what the intended purpose of the corrective measures study is. The tasks delineated in the July 2006 "Corrective Measures Pre-Design Activities Work Plan" were covered in the February 2008 document. I agree with the recommendations given in Section 1.4. This is the information that was covered in our October 2007 meeting with the facility and their consultants.

Section 2: With regard to the additional non-aqueous-phase liquids delineation, I agree with the recommendation to abandon the temporary wells, but monitor existing permanent wells MW-25, MW-27, MW-28, MW-29 and MW-30. I did have one question: the PID data in Appendix A indicated hits in some of the temporary wells. Were these readings taken during drilling or were they taken while measuring the fluid levels? The readings were ranged from less than 1 ppm to greater than 1000 ppm.

Section 3: In this section, the vadose-zone contamination delineation in the sludge-lagoon area is discussed. Based on the information given in the report, I agree with the recommendations given in Section 3.4. The report mentions a Sludge-Lagoon Closure Plan to specify the stabilization procedure and design of the cover/cap to minimize infiltration. When will this Plan be available for review?

Section 4: I could not find an estimate of how many cubic feet of sludge are in the lagoon. Is this another reason the facility has opted to close in place, rather than dig out the sludge and haul it off for disposal? With regard to the contaminants in the lagoon: hadn't this information been given in past documents? MDEQ should have this info, since they granted the delisting in December 1982. According to the first paragraph of Section 4, the sludge was not a hazardous waste, so there must have been some analytical data to back this up. It appears that the sludge-stabilization tests show that closing in place is a viable option for the sludge and could reduce vadose–zone contamination impact to the groundwater. As your comment noted, if this is not a clean closure, then the sludge lagoon must be added to the Financial Assurance Plan.

Section 5: This scenario was discussed during the October 2007 meeting with the facility. Based on the data they gave then and in this document, the recommendations listed in Section 5.4 are adequate. And, I think your comment 5 expands on the indoor air monitoring issue and is appropriate in requesting a paired air monitoring event using the same locations as before. This would give more information on whether the Sheet Pile Barrier should ultimately be constructed.

Section 6: Based on the recommendations given in Section 6.4, I agree that high-vacuum multiphase extraction was not as successful as had been hoped for. The use of manual bailers seems to be a good option for problem. It appears the dissolved-phase toluene may actually be beneficial in affecting the longevity of the zero-valent iron in the PRB. Is there anyone in the Atlanta office who is familiar with this concept and could comment on it?

Section 7: I don't have a copy of the permit so I can't address the institutional controls that have been implemented for this site. I will defer to your comments on this.

Section 8: I agree with the summary of recommendations given here. With regard to your comment on Section 8.3 to further define the cap, it does need to be stated if it is an impermeable cap.

Section 9: No comment.

Appendices: No comment.

UNITED STATES ENVIRONMENTAL PR
REGION 4
ATLANTA FEDERAL CEN
61 FORSYTH STREET
ATLANTA, GEORGIA 30303

JAN 29 2009

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Sent To: Mr. Don Williams / Grenada MFG,
Street, Apt. No.; or PO Box No.: 635 Hwy 332
City, State, ZIP+4: Grenada, MS 38901

PS Form 3800, June 2002 — See Reverse for Instruction

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Don Williams, Plant Environmental Coordinator
Grenada Manufacturing, LLC
635 Highway 332
Grenada, Mississippi 38901

SUBJECT: Groundwater Monitoring Program Optimization Plan
Sludge Lagoon Closure and Post Closure Monitoring Plan
Grenada Manufacturing, LLC / EPA ID No. MSD007037278

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If you have any questions or concerns regarding this letter, please contact Mr. Don Webster, your EPA Project Manager, at (404) 563-8469.

Sincerely,

D. Karen Knight, CHMM
Chief, Corrective Action Section
RUST Branch

cc: Toby Cook, MDEQ
Linda S. Furlough, ArvinMeritor
Ihsan AlFayyomi, Brown and Caldwell
David O'Connor, Textron Automotive

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To: DON WILLIAMS GRENADA MFG, LLC

Street: 635 HIGHWAY 332

City: GRENADA **State:** MS **Zip Code:** 38901

Sender: WEBSTER DONALD **Ext:** 28469

(LastName, FirstName Middle Initial)

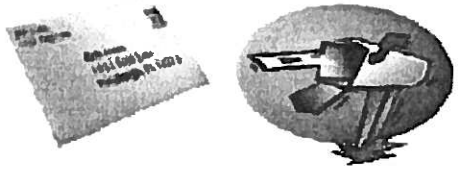
Division: RUS **Floor:** 10

Building: AFCTOWER **Unit:**

Alternate: **Alternate Ext:**

(LastName, FirstName Middle Initial)

Site Name: **Site ID:**



Ready

start > Fw: EPA lead faciliti... Conference Room Sc... Certified Mail Trackin...

4700 Lakehurst Court
Suite 100
Columbus, OH 43016
Tel: (614) 410-6144
Fax: (614) 410-3088

OK = ME
E. 1/5/09

BROWN AND CALDWELL

December 23, 2008

131016.002

Mr. Donald Webster
U.S. EPA Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303

Subject: Solid Waste Management Unit 4 – Sludge Lagoon
Closure and Post-Closure Care Plan
Grenada, Mississippi

Dear Mr. Webster:

On behalf of ArvinMeritor, Inc., Brown and Caldwell (BC) respectfully submits the enclosed revisions to the Closure and Post-Closure Care Plan (Plan) for Solid Waste Management Unit 4 – Sludge Lagoon at the former ArvinMeritor, Inc. facility in Grenada, Mississippi. Three copies of the Plan revisions are enclosed for your distribution and review.

The revisions were prepared to respond to a comment the Mississippi Department of Environmental Quality (MDEQ) had with the composition of materials to be used in the final cover system. The subbase material that will be constructed on top of the solidified/stabilized sludge material and upon which the geomembrane of the final cover system will be constructed was inadvertently entered into the HELP Model as possessing a "soil texture" of 5 instead of 11. The effect of using soil texture 11 instead of soil texture 5 is the permeability value of 6.4×10^{-5} centimeters per second (cm/sec) versus 1.0×10^{-3} cm/sec, respectively. The 6.4×10^{-5} cm/sec value for the permeability more closely reflects the permeability of the silty clay soil materials present at the Site based on information obtained from soil borings and geotechnical test results from the "Soil and Foundation Investigation, Wastewater Treatment Facilities, Rockwell International, Grenada, Mississippi" report dated June 12, 1975 prepared by Ware Lind Engineers, Inc. of Jackson, Mississippi.

The HELP Model was revised using soil texture 11 and the permeability value of 6.4×10^{-5} cm/sec for the subbase material. The results of the revised HELP Model provide the same conclusions as previously presented; the final cover system as proposed is effective in minimizing both the amount of surface water infiltration into the subbase and ultimately the solidified/stabilized sludge material and the maximum head of infiltrated surface water on top of the geomembrane. The revised HELP Model is provided as part of the Plan revisions.

If you have any questions during your review of the Plan revisions, please do not hesitate to contact us at (614) 410-6144.

Very truly yours,

Brown and Caldwell

Richard A. Isaac, P.E.
Principal Engineer

Ihsan Al-Fayyomi
Vice President

Enclosures

c: Pradib Bhowal, Mississippi Department of Environmental Quality
Toby Cook, Mississippi Department of Environmental Quality
David O'Connor, ArvinMeritor, Inc.
Don Williams, Grenada Stamping

SOILD WASTE MANAGEMENT UNIT 4 – SLUDGE LAGOON
CLOSURE AND POST-CLOSURE CARE PLAN
DECEMBER 2008 REVISION INSTRUCTION SHEET

CLOSURE PLAN TEXT

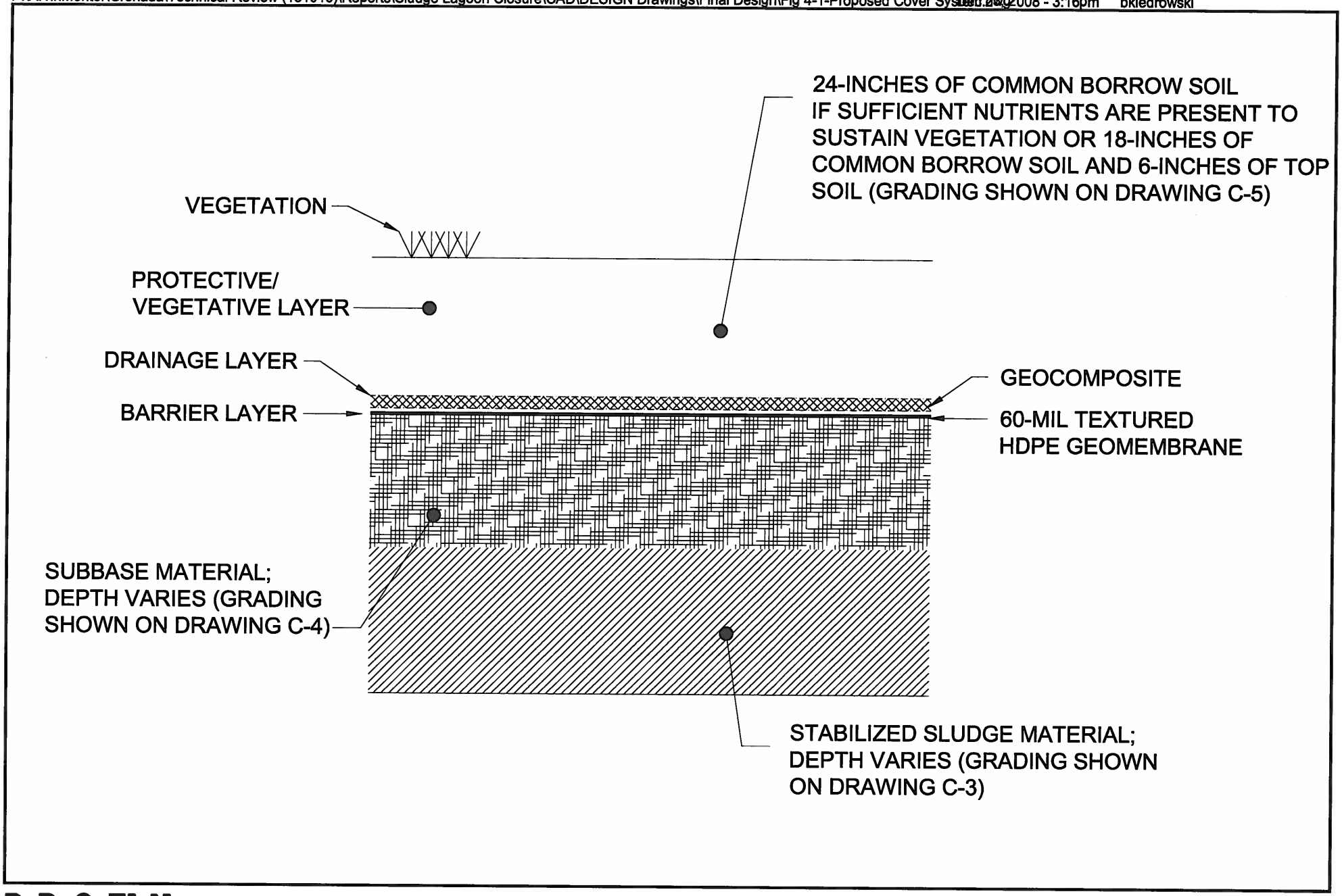
Remove the existing Figure 2-1 Final Cover System Configuration page 2-8 and replace with revised Figure 2-1 Final Cover System Configuration page 2-8.

APPENDICES

Appendix C – HELP Model Results

Remove the existing contents of Appendix C dated 06/13/08 and insert the revised contents of Appendix C dated 12/23/08.

P:\ArvinMeritor\Grenada\Technical Review (131016)\Reports\Sludge Lagoon Closure\CAD\DESIGN Drawings\Final Design\Fig 4-1-Proposed Cover System.dwg Dec 29, 2008 - 3:16pm bkiedrowski



BROWN AND CALDWELL

FIGURE 2-1
PROPOSED FINAL COVER SYSTEM

APPENDIX C

HELP Model Results

APPENDIX C

HELP Model Results

BROWN AND CALDWELL

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		131016.002.002	RAI	12/23/08	4(REV)	1 of 3

Project	Subject
Grenada Sludge Lagoon Closure Plan	Final Cover Effectiveness

References/Notes

OBJECTIVE: To determine the effectiveness of the proposed final cover system in minimizing the amount of surface water infiltration into the solidified/stabilized sludge below the proposed final cover system. This calculation will also demonstrate that the maximum head on the 60-mil, textured HDPE geomembrane does not exceed 12 inches.

METHODOLOGY: The Hydrologic Evaluation of Landfill Performance (HELP) Model Version 3.07 was used to simulate the proposed final cover system and surface water generation from the geocomposite drainage component. The model utilizes climatologic, soil and design data, and performs a solution technique that accounts for the effects of surface layer storage, runoff, infiltration, percolation, evapotranspiration, soil moisture storage, and lateral drainage to calculate a surface water generation volume.

Climatological Data: The HELP Model utilizes historical precipitation data and generates synthetic temperature and solar radiation data for various cities in the United States. The nearest pre-defined climatic data location to the Site is Jackson, Mississippi. This data was used to evaluate the effectiveness of the proposed final cover system over a period of five years.

Soil and Design Data: To model the effectiveness of the proposed final cover system, two scenarios were considered and are discussed below. The scenarios model the proposed final cover system which includes a geocomposite drainage layer overlayed with a protective/vegetative cover layer.

Each scenario models a protective/vegetative layer thickness of 2-feet above the geocomposite drainage layer installed on top of the 60-mil, textured HDPE geomembrane. The surface slope of 8.0 percent and a slope length of 160 feet are used to calculate the SCS runoff curve number.

Scenario No. 1 is intended to model the proposed final cover system under the "bare ground" condition (i.e. no vegetation growing). Scenario No. 2 is intended to model the proposed final cover system with a "fair stand" of grass present. The two scenarios represent the final cover system at two distinct points: Scenario No. 1 at the completion of the final cover installation and Scenario No. 2 at a point in time when adequate vegetative cover is present.
The following tables summarize the scenarios for each condition in ascending order from the top down and present the following data: HELP Model default material texture number, component thickness, and component permeability. The default material texture number classifies each component within the given scenario with specific default values for the proposed soil and liner components. Each material has default values for total porosity, field capacity, wilting point, and saturated hydraulic conductivity.

Scenario No. 1 – Bare Ground

	Layer	Texture No.	Thickness	Permeability (cm/sec)
Layer 1	Protective/Vegetative Cover	5	24 inches	1.00E-03
Layer 2	Geocomposite Drainage Layer	20	250 mils	1.00E+01
Layer 3	Geomembrane Barrier Layer	35	60 mils	2.00E-13
Layer 4	Subbase	11	196.8 inches	6.40E-05

BROWN AND CALDWELL

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		131016.002.002	RAI	12/23/08	4(REV)	2 of 3

Project	Subject
Grenada Sludge Lagoon Closure Plan	Final Cover Effectiveness

References/Notes

Scenario No. 2 – Fair Stand of Grass

	Layer	Texture No.	Thickness	Permeability (cm/sec)
Layer 1	Protective/Vegetative Cover	5	24 inches	1.00E-03
Layer 2	Geocomposite Drainage Layer	20	250 mils	1.00E+01
Layer 3	Geomembrane Barrier Layer	35	60 mils	2.00E-13
Layer 4	Subbase	11	196.8 inches	6.40E-05

ANALYSIS: The results of the HELP Model provided the following:

	Peak Daily Values	
	Drainage from Layer 2	**Maximum Head on Layer 3**
Scenario No. 1	3,631 CF (27,162 gallons)	0.073 inches
Scenario No. 2	4,034 CF (30,178 gallons)	0.077 inches

CONCLUSIONS: For each scenario, the geocomposite drainage layer, Layer 2 provides adequate flow of infiltrated surface water resulting from rainfall events away from Layer 3 (the geomembrane) which results in a maximum head value of much less than the allowable 12 inches.

The potential amount of surface water infiltration into the solidified/stabilized sludge below the proposed final cover system is 0.01979 cubic feet (0.15 gallons) and 0.02171 cubic feet (0.16 gallons) for Scenario No. 1 and Scenario No. 2, respectively. Therefore, the final cover system as proposed is effective in minimizing both the amount of surface water infiltration into the subbase and the head of infiltrated surface water on top of the geomembrane.

BROWN AND CALDWELL

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		131016.002.002	RAI	12/23/08	4(REV)	3 of 3

Project	Subject
Grenada Sludge Lagoon Closure Plan	Final Cover Effectiveness

References/Notes

Attachment 1

Help Model Output Files

```
**********************************************************************************
**********************************************************************************
**                                                                              **
**                                                                              **
**                HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                 **
**                  HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                  **
**                     DEVELOPED BY ENVIRONMENTAL LABORATORY                    **
**                       USAE WATERWAYS EXPERIMENT STATION                      **
**                  FOR USEPA RISK REDUCTION ENGINEERING LABORATORY             **
**                                                                              **
**                                                                              **
**********************************************************************************
**********************************************************************************

PRECIPITATION DATA FILE:     C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE:       C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE:   C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA:     C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE:   C:\HELP3\DATA10.D10
OUTPUT DATA FILE:            C:\HELP3\BARE.OUT

TIME:  11:29     DATE:  12/23/2008

**********************************************************************************

     TITLE:  Sludge Lagoon Closure - Final Cover Design: Bare Ground

**********************************************************************************

     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                     =     24.00   INCHES
          POROSITY                      =      0.4570 VOL/VOL
          FIELD CAPACITY                =      0.1310 VOL/VOL
          WILTING POINT                 =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0.3182 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0.100000005000E-02 CM/SEC


                                  LAYER  2
                                  --------

                  TYPE 2 - LATERAL DRAINAGE LAYER
```

MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.25	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0815	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	8.00	PERCENT
DRAINAGE LENGTH	=	160.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 11

THICKNESS	=	196.80	INCHES
POROSITY	=	0.4640	VOL/VOL
FIELD CAPACITY	=	0.3100	VOL/VOL
WILTING POINT	=	0.1870	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.639999998000E-04	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 8.% AND A SLOPE LENGTH OF 160. FEET.

SCS RUNOFF CURVE NUMBER	=	84.60	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	10.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.182	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	4.570	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.580	INCHES
INITIAL SNOW WATER	=	0.000	INCHES

INITIAL WATER IN LAYER MATERIALS	=	68.664	INCHES
TOTAL INITIAL WATER	=	68.664	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
JACKSON MISSISSIPPI

STATION LATITUDE	=	32.33	DEGREES
MAXIMUM LEAF AREA INDEX	=	0.00	
START OF GROWING SEASON (JULIAN DATE)	=	61	
END OF GROWING SEASON (JULIAN DATE)	=	328	
EVAPORATIVE ZONE DEPTH	=	10.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.40	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	74.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	77.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
5.00	4.48	5.86	5.85	4.83	2.94
4.40	3.71	3.55	2.62	4.18	5.40

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
45.70	49.10	56.30	65.10	72.50	79.20
81.90	81.20	76.40	65.00	54.90	48.60

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI
AND STATION LATITUDE = 32.33 DEGREES

****

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT

PRECIPITATION	49.22	178668.609	100.00
RUNOFF	3.016	10948.225	6.13
EVAPOTRANSPIRATION	26.503	96205.633	53.85
DRAINAGE COLLECTED FROM LAYER 2	19.7020	71518.125	40.03
PERC./LEAKAGE THROUGH LAYER 3	0.000135	0.489	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0019		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.001	-3.323	0.00
SOIL WATER AT START OF YEAR	72.384	262753.687	
SOIL WATER AT END OF YEAR	72.383	262750.344	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.059	0.00

****

****

ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.79	191627.672	100.00
RUNOFF	6.160	22361.500	11.67
EVAPOTRANSPIRATION	26.817	97344.734	50.80
DRAINAGE COLLECTED FROM LAYER 2	22.9573	83335.094	43.49
PERC./LEAKAGE THROUGH LAYER 3	0.000154	0.561	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0022		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.144	-11413.568	-5.96
SOIL WATER AT START OF YEAR	72.383	262750.344	
SOIL WATER AT END OF YEAR	69.239	251336.781	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.085	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	58.86	213661.766	100.00
RUNOFF	5.231	18989.881	8.89
EVAPOTRANSPIRATION	28.042	101792.992	47.64
DRAINAGE COLLECTED FROM LAYER 2	24.9661	90626.883	42.42
PERC./LEAKAGE THROUGH LAYER 3	0.000167	0.607	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0024		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.620	2252.050	1.05
SOIL WATER AT START OF YEAR	69.239	251336.781	
SOIL WATER AT END OF YEAR	69.859	253588.844	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.045	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.14	171118.219	100.00
RUNOFF	2.401	8715.821	5.09
EVAPOTRANSPIRATION	27.930	101386.867	59.25
DRAINAGE COLLECTED FROM LAYER 2	16.5876	60212.867	35.19
PERC./LEAKAGE THROUGH LAYER 3	0.000119	0.433	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0016		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.221	802.676	0.47

SOIL WATER AT START OF YEAR	69.859	253588.844	
SOIL WATER AT END OF YEAR	70.080	254391.516	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.008	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.07	203534.078	100.00
RUNOFF	4.726	17154.428	8.43
EVAPOTRANSPIRATION	29.200	105996.266	52.08
DRAINAGE COLLECTED FROM LAYER 2	21.8674	79378.594	39.00
PERC./LEAKAGE THROUGH LAYER 3	0.000150	0.544	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0021		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.277	1004.847	0.49
SOIL WATER AT START OF YEAR	70.080	254391.516	
SOIL WATER AT END OF YEAR	70.357	255396.359	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.052	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						

TOTALS	3.80	3.65	5.41	5.50	5.64	3.86
	4.92	4.51	2.90	2.95	4.32	5.35
STD. DEVIATIONS	3.95	1.25	2.37	4.10	3.14	1.00
	2.30	2.07	1.25	1.89	1.75	3.39

RUNOFF

TOTALS	0.298	0.147	0.612	0.537	0.824	0.127
	0.178	0.518	0.190	0.259	0.321	0.297
STD. DEVIATIONS	0.478	0.126	0.708	0.812	0.957	0.126
	0.206	0.954	0.302	0.529	0.307	0.355

EVAPOTRANSPIRATION

TOTALS	1.569	1.958	2.522	2.619	3.175	2.774
	3.525	2.640	1.881	1.805	1.722	1.507
STD. DEVIATIONS	0.231	0.282	0.752	0.892	1.550	0.395
	1.079	0.520	1.085	0.617	0.242	0.148

LATERAL DRAINAGE COLLECTED FROM LAYER 2

TOTALS	3.2136	1.4598	2.2501	1.9253	2.4922	0.7553
	1.4076	1.1824	0.6557	1.2930	1.5903	2.9906
STD. DEVIATIONS	2.1044	1.3157	1.3917	1.4404	1.6736	0.5673
	0.9277	0.9062	0.6446	1.0566	1.0100	1.4710

PERCOLATION/LEAKAGE THROUGH LAYER 3

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	0.0037	0.0018	0.0026	0.0023	0.0029	0.0009
	0.0016	0.0014	0.0008	0.0015	0.0019	0.0034
STD. DEVIATIONS	0.0024	0.0017	0.0016	0.0017	0.0019	0.0007
	0.0011	0.0010	0.0008	0.0012	0.0012	0.0017

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.82 (4.803)	191722.1	100.00
RUNOFF	4.307 (1.5623)	15633.97	8.154
EVAPOTRANSPIRATION	27.698 (1.0762)	100545.30	52.443
LATERAL DRAINAGE COLLECTED FROM LAYER 2	21.21606 (3.21070)	77014.312	40.16977
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00015 (0.00002)	0.527	0.00027
AVERAGE HEAD ON TOP OF LAYER 3	0.002 (0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000 (0.00000)	0.000	0.00000
CHANGE IN WATER STORAGE	-0.405 (1.5472)	-1471.46	-0.767

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	4.79	17387.699
RUNOFF	2.221	8063.9995
DRAINAGE COLLECTED FROM LAYER 2	1.00029	3631.03516
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000005	0.01979
AVERAGE HEAD ON TOP OF LAYER 3	0.036	
MAXIMUM HEAD ON TOP OF LAYER 3	0.073	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00000
SNOW WATER	1.18	4291.8257

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3298
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0674

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	5.6239	0.2343
2	0.0055	0.0221
3	0.0000	0.0000
4	61.0077	0.3100
SNOW WATER	0.000	

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**                                                                  **
**                                                                  **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE        **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)        **
**                   DEVELOPED BY ENVIRONMENTAL LABORATORY          **
**                     USAE WATERWAYS EXPERIMENT STATION            **
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY      **
**                                                                  **
**                                                                  **
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PRECIPITATION DATA FILE:     C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE:       C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE:   C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA:     C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE:   C:\HELP3\DATA10.D10
OUTPUT DATA FILE:            C:\HELP3\GRASS.OUT

TIME:  13:32     DATE:  12/23/2008

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     TITLE:  Sludge Lagoon Closure - Final Cover Design: Fair Grass Stand

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                LAYER  1
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                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                     =     24.00   INCHES
          POROSITY                      =      0.4570 VOL/VOL
          FIELD CAPACITY                =      0.1310 VOL/VOL
          WILTING POINT                 =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0.3079 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                LAYER  2
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TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.25	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0969	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	8.00	PERCENT
DRAINAGE LENGTH	=	160.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 11

THICKNESS	=	196.80	INCHES
POROSITY	=	0.4640	VOL/VOL
FIELD CAPACITY	=	0.3100	VOL/VOL
WILTING POINT	=	0.1870	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.639999998000E-04	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 8.% AND A SLOPE LENGTH OF 160. FEET.

SCS RUNOFF CURVE NUMBER	=	84.60	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	6.764	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.054	INCHES

LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.276	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	68.420	INCHES
TOTAL INITIAL WATER	=	68.420	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
JACKSON MISSISSIPPI

STATION LATITUDE	=	32.33	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	61	
END OF GROWING SEASON (JULIAN DATE)	=	328	
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.40	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	74.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	77.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
5.00	4.48	5.86	5.85	4.83	2.94
4.40	3.71	3.55	2.62	4.18	5.40

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
45.70	49.10	56.30	65.10	72.50	79.20
81.90	81.20	76.40	65.00	54.90	48.60

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSON MISSISSIPPI
AND STATION LATITUDE = 32.33 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.22	178668.609	100.00
RUNOFF	2.386	8660.419	4.85
EVAPOTRANSPIRATION	26.776	97195.258	54.40
DRAINAGE COLLECTED FROM LAYER 2	20.0583	72811.758	40.75
PERC./LEAKAGE THROUGH LAYER 3	0.000136	0.494	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0019		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.000	1.080	0.00
SOIL WATER AT START OF YEAR	72.140	261867.594	
SOIL WATER AT END OF YEAR	72.140	261868.672	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.088	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.79	191627.672	100.00
RUNOFF	5.395	19582.811	10.22
EVAPOTRANSPIRATION	28.405	103109.430	53.81
DRAINAGE COLLECTED FROM LAYER 2	22.4573	81519.992	42.54
PERC./LEAKAGE THROUGH LAYER 3	0.000149	0.543	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0022		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.467	-12584.556	-6.57
SOIL WATER AT START OF YEAR	72.140	261868.672	
SOIL WATER AT END OF YEAR	68.673	249284.109	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	58.86	213661.766	100.00
RUNOFF	4.521	16409.861	7.68
EVAPOTRANSPIRATION	30.158	109473.711	51.24
DRAINAGE COLLECTED FROM LAYER 2	23.5331	85425.211	39.98
PERC./LEAKAGE THROUGH LAYER 3	0.000158	0.575	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0023		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.648	2352.997	1.10
SOIL WATER AT START OF YEAR	68.673	249284.109	
SOIL WATER AT END OF YEAR	69.322	251637.109	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.016	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.14	171118.219	100.00
RUNOFF	2.022	7341.158	4.29
EVAPOTRANSPIRATION	27.544	99984.227	58.43
DRAINAGE COLLECTED FROM LAYER 2	17.6710	64145.570	37.49
PERC./LEAKAGE THROUGH LAYER 3	0.000125	0.452	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0017		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00

CHANGE IN WATER STORAGE	-0.097	-352.775	-0.21
SOIL WATER AT START OF YEAR	69.322	251637.109	
SOIL WATER AT END OF YEAR	69.224	251284.328	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.050	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.07	203534.078	100.00
RUNOFF	4.743	17217.221	8.46
EVAPOTRANSPIRATION	28.224	102454.180	50.34
DRAINAGE COLLECTED FROM LAYER 2	22.1276	80323.062	39.46
PERC./LEAKAGE THROUGH LAYER 3	0.000151	0.547	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0022		
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.975	3539.577	1.74
SOIL WATER AT START OF YEAR	69.224	251284.328	
SOIL WATER AT END OF YEAR	70.199	254823.906	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.042	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC

PRECIPITATION						
TOTALS	3.80	3.65	5.41	5.50	5.64	3.86
	4.92	4.51	2.90	2.95	4.32	5.35
STD. DEVIATIONS	3.95	1.25	2.37	4.10	3.14	1.00
	2.30	2.07	1.25	1.89	1.75	3.39
RUNOFF						
TOTALS	0.278	0.148	0.593	0.554	0.762	0.073
	0.104	0.402	0.170	0.164	0.288	0.278
STD. DEVIATIONS	0.448	0.120	0.728	0.871	0.929	0.086
	0.140	0.826	0.279	0.329	0.269	0.326
EVAPOTRANSPIRATION						
TOTALS	1.298	1.722	2.320	2.641	4.793	3.336
	3.815	2.881	1.731	1.574	1.124	0.985
STD. DEVIATIONS	0.207	0.254	0.701	0.467	1.418	0.553
	1.404	1.469	1.111	0.308	0.128	0.249
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	3.1826	1.7545	2.4176	2.0096	2.3852	1.0003
	1.0935	1.0577	0.6033	0.8023	1.3846	3.4783
STD. DEVIATIONS	2.2824	1.3019	1.4552	1.8018	1.7201	0.3928
	0.4864	0.3998	0.3473	0.4423	0.7385	1.7226
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3						
AVERAGES	0.0036	0.0022	0.0028	0.0024	0.0027	0.0012
	0.0013	0.0012	0.0007	0.0009	0.0016	0.0040
STD. DEVIATIONS	0.0026	0.0016	0.0017	0.0021	0.0020	0.0005
	0.0006	0.0005	0.0004	0.0005	0.0009	0.0020

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.82 (4.803)	191722.1	100.00
RUNOFF	3.813 (1.5092)	13842.29	7.220
EVAPOTRANSPIRATION	28.221 (1.2584)	102443.35	53.433
LATERAL DRAINAGE COLLECTED FROM LAYER 2	21.16945 (2.32580)	76845.117	40.08152
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00014 (0.00001)	0.522	0.00027
AVERAGE HEAD ON TOP OF LAYER 3	0.002 (0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000 (0.00000)	0.000	0.00000
CHANGE IN WATER STORAGE	-0.388 (1.7781)	-1408.74	-0.735

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	4.79	17387.699
RUNOFF	1.878	6818.6680
DRAINAGE COLLECTED FROM LAYER 2	1.11136	4034.24219
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000006	0.02171
AVERAGE HEAD ON TOP OF LAYER 3	0.039	
MAXIMUM HEAD ON TOP OF LAYER 3	0.077	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	2.2 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00000
SNOW WATER	1.18	4291.8257
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3075	

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0580

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	5.4688	0.2279
2	0.0030	0.0118
3	0.0000	0.0000
4	61.0076	0.3100
SNOW WATER	0.000	

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